What is claimed is:

1. A method for fabricating a III-V nitride film, comprising the steps of:

preparing a reactor horizontally,

setting a substrate onto a susceptor installed in the reactor,

heating the substrate to a predetermined temperature,

directly cooling at least the portion of the inner wall of the reactor opposite to the substrate, and

introducing a III raw material gas and a V raw material gas with a carrier gas onto the substrate, and thus, fabricating a III-V nitride film by a MOCVD method.

2. A fabricating method as defined in claim 1, wherein the susceptor is set on the bottom wall of the reactor, and the opposite portion of the top wall of the reactor to the substrate set on the susceptor is cooled down.

3. A fabricating method as defined in claim 1, wherein the upper stream of the reactor from the substrate set on the susceptor is cooled down.

4. A fabricating method as defined in claim 1, wherein the whole of the reactor is cooled down.

5. A fabricating method as defined in claim 1, wherein the III-V nitride film is an Al-rich AlxGayInzN ($x+y+z=1$, $x>0.5$, $y\geq 0$, $Z\geq 0$) film.

6. A fabricating method as defined in claim 1, wherein the III-V nitride film is an AlN film.

7. An apparatus for fabricating a III-V nitride film by a MOCVD method, comprising:

a reactor prepared horizontally,

a susceptor to hold a substrate thereon installed in the reactor,

a heater to heat the substrate to a predetermined temperature via the susceptor, and

a cooling means to directly cool down at least the portion of the inner wall of the reactor opposite to the substrate.

8. A fabricating apparatus as defined in claim 7, wherein the cooling means includes a cooling jacket, a pump to flow a given cooling medium through the cooling jacket and a cooling medium temperature-controlling means to control the temperature of the cooling medium.

9. A fabricating apparatus as defined in claim 7, wherein the cooling jacket

is made of stainless steel and the reactor is made of quartz.

10. A fabricating apparatus as defined in claim 7, wherein the cooling means is provided over the reactor entirely.

11. A fabricating apparatus as defined in claim 7, further comprising a housing on the outer side of the reactor, wherein the cooling means is provided on the outer side of the housing.

12. A fabricating apparatus as defined in claim 7, further comprising another cooling means at the upper stream of the reactor from the substrate set on the susceptor.